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BEFORE THE  
PUBLIC SERVICE COMMISSION OF WISCONSIN

Northern States Power Company - Wisconsin, an Xcel Energy Company,  
Request for Approval to Construct a Biomass Gasifier at its Bay Front  
Generating Facility

4220-CE-169

**FINAL DECISION**

**Introduction**

On February 23, 2009, Northern States Power Company-Wisconsin (NSPW) applied to the Commission for authority to construct, install, and place in operation equipment that would produce synthetic gas (syngas) from biomass for the production of electricity at NSPW's existing Bay Front Generating Facility (Bay Front) in Ashland, Wisconsin. NSPW is seeking a Certificate of Authority under Wis. Stat. § 196.49 and Wis. Admin. Code ch. PSC 112 for its project. NSPW proposes to cease using coal as a fuel and substitute syngas from a biomass gasifier for Bay Front Unit 5. It would modify Unit 5's existing boiler so it can combust syngas and natural gas.

The Certificate of Authority is GRANTED, subject to conditions.

Public hearings are not required under Wis. Stat. § 196.49, but the Commission scheduled technical hearings and hearings to gather public testimony on August 12, 13, and 17, 2009, at the Commission offices in Madison and by telephone connection with the Ashland City Hall. Persons who appeared and testified are listed in the Commission's files; all written public testimony was entered into the record as an exhibit. The parties that appeared before the Commission are named in Appendix A of this Final Decision.

The parties submitted initial briefs on September 11, 2009, and reply briefs on September 28, 2009. The Commission deliberated on this matter at its October 30, 2009, open meeting.

### **Findings of Fact**

1. NSPW is a public utility engaged in rendering electric service in Wisconsin, pursuant to Wis. Stat. § 196.01(5).
2. NSPW's project, as modified by this Final Decision, will not substantially impair NSPW's efficiency of service or provide facilities unreasonably in excess of probable future requirements. In addition, when placed in operation, the project will increase the value or available quantity of NSPW's service in proportion to its cost of service.
3. Energy conservation is not a cost-effective alternative to NSPW's project.
4. Wind power is not a cost-effective alternative to NSPW's project.
5. Retiring Bay Front Unit 5 and substituting energy purchased in the wholesale market, or converting Bay Front Unit 5 so it burns only natural gas instead of coal, are not environmentally sound alternatives. These alternatives would involve the substantial use of fossil fuels and their attendant release of air pollutants and greenhouse gases.
6. The record does not conclusively demonstrate that Bay Front is a brownfield site, but using any other site for this project is not practicable.

### **Conclusions of Law**

The Commission has jurisdiction under Wis. Stat. §§ 1.11, 1.12, 196.02, 196.025, 196.395, 196.40, and 196.49, and Wis. Admin. Code chs. PSC 4 and 112, to issue a certificate and order authorizing NSPW to construct and place in operation equipment that produces syngas from biomass for the production of electricity at Bay Front and to modify Bay Front Unit 5 to burn

syngas and natural gas, pursuant to NSPW's application and subject to the conditions stated in this Final Decision.

### **Opinion**

NSPW is proposing to replace coal-fired generation at Bay Front Unit 5 with a renewable resource. After examining a variety of alternatives, NSPW has applied for a Certificate of Authority to construct a biomass gasification project to provide fuel for Unit 5. NSPW estimates the total project capital cost at \$58.1 million. When burning 100 percent syngas, the boiler would have an electric generating capacity of 20 megawatts (MW). By burning 100 percent natural gas or by using natural gas as a "topping fuel" with syngas, NSPW could expand the unit's generating capacity to 28 MW. The major components of NSPW's project are:

1. Installing additional biomass receiving, storage, and handling equipment;
2. Installing a biomass gasification system, to convert waste wood biomass to syngas;
3. Modifying the Unit 5 boiler to burn syngas effectively and produce steam for electric power generation;
4. Adding enhanced flue gas filtering equipment to capture residual particulates.

In its application, NSPW declared its intent to switch from coal to woody biomass as the fuel for Unit 5. The sources of biomass would be residual wood from forest products firms, such as window and furniture companies in the area, harvest residue that has been left behind after a forest is logged species such as tamarack, hemlock, or cedar, and cull or mortality-class trees. NSPW also indicated its interest in testing the potential for developing whole tree plantations, dedicated to growing an energy crop, and in using creosote-treated railroad ties. These materials qualify as a renewable resource for purposes of the Renewable Portfolio Standard Statute,

Wis. Stat. § 196.378. Under Wis. Stat. § 196.378(1)(h)1.g, biomass is a renewable resource, and these materials fit the definition of “biomass” in Wis. Stat. § 196.378(1)(ar).<sup>1</sup>

NSPW is currently using approximately 200,000 tons/year of biomass to fuel the other two units at Bay Front. Converting Unit 5 to syngas combustion, produced from biomass, will approximately double the consumption of biomass at the plant. NSPW projects that switching from coal to syngas will significantly reduce air pollution: carbon dioxide emissions will drop by 100 percent, to a net emission rate of zero; nitrogen oxides by more than 60 percent; particulate matter by more than 80 percent; sulfur dioxides by more than 80 percent; mercury by more than 80 percent; and opacity by more than 50 percent. NSPW also estimates that its purchase of biomass will inject an additional \$5.3 million annually into the local economy, to generate 135,000 megawatt hours (MWh) of renewable-based electricity.

The project requires regulatory reviews and approvals by the Commission, the Minnesota Public Utilities Commission, and the North Dakota Public Service Commission. It also needs air emissions permit revisions for the facility from the Wisconsin Department of Natural Resources (DNR). NSPW forecasts that it would begin commercial operation of the new facility in late 2012.

### **Renewable Portfolio Standard**

Current law, both in Wisconsin and in Minnesota, requires that electric providers produce a minimum level of electric energy from renewable resources. Wisconsin’s Renewable Portfolio Standard (RPS) sets a statewide goal that 10 percent of the energy consumed in the state will be generated from renewable resources by 2015. To achieve this goal, each Wisconsin electric

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<sup>1</sup> Wis. Stat. § 196.378(1) states:

(ar) “Biomass” means a resource that derives energy from wood or plant material or residue, biological waste, crops grown for use as a resource or landfill gases. “Biomass” does not include garbage, as defined in s. 289.01 (9), or nonvegetation-based industrial, commercial or household waste, except that “biomass” includes refuse-derived fuel used for a renewable facility that was in service before January 1, 1998.

provider must increase its production of renewable energy in 2010 and again in 2015.<sup>2</sup> The mandated levels differ among electric providers; by 2015 NSPW must raise its production of renewable energy from current levels by approximately 4 percent, so that at least 12.85 percent of its electricity is from renewable resources in 2015 and thereafter.

NSPW is part of an integrated, multi-state NSP System, which owns both NSPW and NSP-Minnesota. These two utilities share all costs of generating and transmission facilities pursuant to an Interchange Agreement approved by the Federal Energy Regulatory Commission. The Interchange Agreement governs NSPW's sources of electric power supply. Under the Interchange Agreement, approximately 80 percent of NSPW's energy requirements are met by NSP-Minnesota generating plants or by wholesale purchases; NSPW produces the remaining 20 percent by generation located in its service territory. NSPW and NSP-Minnesota will share all the energy and capacity that this project produces, as well as its associated costs, under the Interchange Agreement.

Minnesota has its own Renewable Energy Standard. It requires NSP-Minnesota to satisfy 30 percent of its customers' electricity needs from renewable resources by the year 2020.

The Citizens' Utility Board (CUB) argues that NSPW does not need the project to comply with Wisconsin's RPS. It maintains that the NSP System is already in the process of securing approximately 450 MW of utility-owned wind generation. CUB cites a 100 MW wind project that NSP recently completed in Minnesota and two other wind projects to be built in Minnesota and North Dakota, totaling 351 MW, for which NSP has received approval from the Minnesota Public Utilities Commission. (Whether other approvals are still needed from North Dakota, or from other Minnesota agencies, is unknown.) CUB also notes that the NSP System is in the process of

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<sup>2</sup> Wis. Stat. § 196.378(2)(a).

purchasing approximately 500 MW of renewable energy. CUB contends that this level of electricity from renewable resources, which the NSP System is acquiring to achieve the higher Minnesota Renewable Energy Standard, exceeds the renewable requirements of the Wisconsin RPS.

Though NSPW conceded that it is currently in compliance with the RPS, the record does not conclusively demonstrate whether this project is necessary for NSPW to meet the RPS for 2015. Nonetheless, no party challenged Commission staff's testimony that the RPS is likely to change and increase further. The Governor's Global Warming Task Force (Task Force), for example, produced a Final Report that recommends an "enhanced" RPS that will accelerate the existing standard and impose additional requirements in years 2020 and 2025.<sup>3</sup> The record also describes multiple bills pending before the U.S. Congress that would impose federal Renewable Electricity Standards.

In preparing its application for the project, NSPW evaluated five alternatives:

1. Market Purchase Option. Continue to burn coal in Unit 5 until 2015, then retire Unit 5 and replace it with market-based energy and capacity.
2. Natural Gas Conversion Option. Continue burning coal in Unit 5 until 2015, then switch to 100 percent natural gas for the remaining life of the boiler.
3. Circulating Fluidized Bed (CFB) Option. Replace Unit 5 with a boiler using CFB technology, which would be fueled primarily by biomass, but could also burn coal or other solid fuels such as pet coke. NSPW modeled the CFB option assuming 100 percent biomass fuel.
4. Wisconsin Wind Option. Retire Unit 5 in 2015 and replace it with comparable wind resources located in Wisconsin.
5. Imported Wind Option. Retire Unit 5 in 2015 and replace it with comparable wind resources located in Minnesota or the Dakotas.

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<sup>3</sup> The Final Report of the Global Warming Task Force proposes an "enhanced" standard that would move from 2015 to 2013 the goal of producing 10 percent of Wisconsin's electric energy from renewable resources, and would impose additional requirements to achieve 20 percent electricity from renewable resources by 2020 and 25 percent by 2025. The Final Report also supports expanding the use of biomass to produce renewable energy and recommends establishing a requirement that a set amount of the renewable energy needed to meet Wisconsin's RPS must be produced in Wisconsin.

In addition, CUB maintains that NSPW should have analyzed energy efficiency as an alternative to this project because the Energy Priority Laws, Wis. Stat. §§ 1.12 and 196.025, require its consideration. If the record showed that NSPW must generate more renewable energy to meet the RPS, the first two project alternatives NSPW evaluated could be ignored because they would not produce renewable energy. Regardless of whether NSPW requires this project to comply with the RPS, this Final Decision considers all five of the alternatives that NSPW examined. It also considers energy efficiency, which state law declares is the highest priority when meeting energy needs.

### **Energy Efficiency Alternative**

Wisconsin Statute §§ 1.12 and 196.025 are known as the Energy Priority Laws. Relevant parts of these statutes provide:

**1.12(3)(b) *Renewable energy resources.*** It is the goal of the state that, to the extent that it is cost-effective and technically feasible, all new installed capacity for electric generation in the state be based on renewable energy resources, including hydroelectric, wood, wind, solar, refuse, agricultural and biomass energy resources.

**(4) PRIORITIES.** In meeting energy demands, the policy of the state is that, to the extent cost-effective and technically feasible, options be considered based on the following priorities, in the order listed:

- (a) Energy conservation and efficiency.
- (b) Noncombustible renewable energy resources.
- (c) Combustible renewable energy resources.
- (d) Nonrenewable combustible energy resources, in the order listed:
  - 1. Natural gas.
  - 2. Oil or coal with a sulphur content of less than 1%.
  - 3. All other carbon-based fuels.

**196.025(1)(ar) *Consideration of energy priorities.*** Except as provided in pars. (b) to (d), to the extent cost-effective, technically feasible and environmentally sound, the commission shall implement the priorities under s. 1.12 (4) in making all energy-related decisions and orders, including strategic energy assessment, rate setting and rule-making orders.

CUB correctly notes that energy efficiency is the highest priority listed in the Energy Priority Laws, but these laws only demand that an energy priority be considered if it is cost-effective, technically feasible, and environmentally sound. NSPW introduced into the record the Resource Plan that the NSP System produced for the Minnesota Public Utilities Commission, which addresses the needs of the entire NSP System. Its cornerstones are energy efficiency and conservation, renewable resources, and carbon reduction. Cost-effective energy conservation is considered on a system-wide basis, and NSPW entered evidence that the NSP System is implementing the maximum achievable energy conservation and any additional energy efficiency efforts, while technically feasible, would not be cost-effective and may not succeed. NSPW also presented information that the Minnesota Public Utilities Commission approved the NSP System's Resource Plan, including its energy conservation and efficiency programs, in August 2009.

Based on the record, the Commission finds that energy efficiency and conservation are not a cost-effective alternative to NSPW's project.

### **Generating Alternatives**

NSPW used the Strategist computer model, a complex computer program, to calculate the overall cost of running the NSP System with either NSPW's proposed project or a project alternative installed. For each alternative, the Strategist model calculated the present value revenue requirements for the total NSP System over 40 years, which is the likely useful life of NSPW's project. Comparing these overall costs provides useful information about whether a project alternative may be more cost-effective than NSPW's project. The model produced these total system costs for the alternatives that NSPW examined:



1.	Market Purchase Option	\$57.525 billion
2.	Natural Gas Conversion Option	\$57.525 billion
3.	CFB Biomass Boiler Option	\$57.632 billion
4.	Wisconsin Wind Option	\$57.578 billion
5.	Imported Wind Option	\$57.559 billion
6.	Proposed Project	\$57.563 billion

### **Market Purchase Option**

The Market Purchase Option is a low-cost alternative to NSPW's project. It raises environmental concerns, however. First, the Market Purchase Option would continue to burn coal in Unit 5 until 2015, with all of the air pollution and greenhouse gas emissions that coal-fired generation produces. In addition, after shutting down Unit 5, NSPW would substitute energy purchases on the wholesale market, which means a substantial amount of the replacement power likely would also be from fossil fuels.

The Market Purchase Option also has the disadvantage that it would shut down a generating unit in an area that does not have a surplus of generating capacity. As a Commission staff engineer witness explained, early retirement of this unit could harm system reliability by increasing the dependence on transmission imports and increasing the risk of service outages due to transmission line failures. Finally, the Market Purchase Option would eliminate jobs in northern Wisconsin and continue the practice of exporting Wisconsin funds to import energy.<sup>4</sup> Building NSPW's project would avoid all of these problems.

For these reasons, the Market Purchase Option is not a reasonable alternative.

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<sup>4</sup> The Commission has not taken a position on whether local economic development benefits can be considered in a construction docket. *Application of Wisconsin Power and Light Company, d/b/a Alliant Energy, for Authority to Construct a New Coal-Fired Electric Generation Unit Known as the Nelson Dewey Generating Station in Cassville, Grant County, Wisconsin*, Public Service Commission of Wisconsin Docket No. 6680-CE-170, *Final Decision* at 11, n. 4 (December 12, 2008). Because this issue is not central to the Commission's decision here, nothing in this Final Decision should be construed as a determination that local economic development factors can be considered by the Commission.

### **Natural Gas Conversion Option**

The Natural Gas Conversion Option would also be less expensive than NSPW's project. While this option would keep Unit 5 in service and retain jobs at the plant site, Unit 5 would no longer serve as a baseload plant. Instead, this option would dispatch the unit only to provide peak energy during periods of extended high system demand. Unit 5 would remain a steam generator, which means less frequent dispatch because it would take longer to ramp the unit up to full output capability. The Natural Gas Conversion Option would also continue to burn fossil fuel to produce electric energy, with its attendant air pollution and greenhouse gas emissions, and its costs would be subject to the greater price volatility of natural gas.

For these reasons, the Natural Gas Conversion Option is not a reasonable alternative.

### **CFB Biomass Boiler Option**

The 30 MW CFB Option would replace Unit 5 with a boiler using CFB technology, which would be fueled primarily by biomass, but could also burn coal or other solid fuels such as pet coke. The CFB Option has the highest capital cost of all of the project alternatives, as well as the highest total NSP System cost. This option also requires significantly more construction over a longer time period than NSPW's proposed gasifier option, as it would involve completely replacing Unit 5 with a new CFB boiler. Although the CFB Option would produce economic benefit to the region, it would provide relatively small benefits gained in return for a relatively large capital investment. The CFB Option would be more expensive than the proposed project even if the capital cost of the proposed project increased by 20 percent. For these reasons, the CFB Option is not a cost-effective alternative.

### **Wisconsin Wind Option**

Like the CFB Option, the Wisconsin Wind Option would have greater capital costs and greater total NSP System costs than NSPW's proposed project. The Wisconsin Wind Option would need additional system support, such as spinning reserves, because a wind farm is a variable resource whose output depends on the strength of the wind. NSPW's proposed project, as a baseload plant, would have the advantages of not requiring the system integration functions to accommodate an intermittent resource and of being dispatchable.

NSPW performed 17 sensitivity analyses with its Strategist computer model. The Wisconsin Wind Option would be more expensive than NSPW's proposed project in all of these sensitivity runs except two: an analysis that assumed the proposed project's capital cost increases by 20 percent (in total NSP System costs over 40 years, the Wisconsin Wind Option would be \$1 million less costly than the proposed project); and an analysis that assumed the price of biomass fuel increases by 40 percent (in total NSP System costs over 40 years, the Wisconsin Wind Option would be \$4 million less costly than the proposed project).

CUB alleges that the estimated costs for NSPW's project are too low, because the utility obtained a cost estimate from only one vendor and may not have included the cost of all necessary pollution control equipment. However, the cost over-run condition included in this Final Decision will control any unidentified excess costs of NSPW's project. Accordingly, the Wisconsin Wind Option is not cost-effective and is not a reasonable alternative.

### **Imported Wind Option**

The Strategist model estimated that the Imported Wind Option would have slightly lower total NSP System costs than NSPW's proposed project. According to the Strategist model results, the total NSP System costs over 40 years of purchasing wind power from outside Wisconsin would

be \$4 million less expensive than biomass gasification. The Imported Wind Option would be slightly more expensive than NSPW's proposed project in capital costs. Most of the Strategist sensitivity runs also showed the Imported Wind Option to be less expensive than the proposed project, ranging up to \$23 million less costly over 40 years if the price of biomass fuel were to increase by 40 percent. However, there is evidence in the record that NSPW had not included the Locational Marginal Pricing (LMP) and line loss costs associated with purchasing out-of-state wind power. A reasonable approximation of these costs, \$5 per MWh, would offset the difference in total NSP System costs between the Imported Wind Option and NSPW's proposed project. Furthermore, if more transmission facilities are required to import wind power that is produced outside Wisconsin, constructing these facilities could increase the cost of the Imported Wind Option further. The proposed project, in contrast, would not have LMP or line loss costs and would avoid the need to build and pay for new transmission improvements.

CUB argues that Commission staff's estimate of LMP/line loss costs is speculative, but the record shows a reasonable range of these costs. To the extent they occur, these costs and the cost of any necessary transmission improvements would fall on the shoulders of Wisconsin ratepayers. Furthermore, an Imported Wind Option would forfeit an opportunity to invest in Wisconsin's own resources. For these reasons, the Imported Wind Option is not a cost-effective alternative.

#### **Proposed Biomass Gasification Project**

As described above, the capital cost for NSPW's proposed project (\$58.1 million) is lower than all the renewable resource alternatives. The total NSP System costs associated with NSPW's proposed project are also lower than the CFB Option or the Wisconsin Wind Option, and are likely to be lower than those of the Imported Wind Option after including LMP costs, line losses, and potential costs associated with the need to build additional transmission lines to import the power.

NSPW's project has other advantages over wind options because it will diversify NSPW's renewable energy portfolio, including the addition of a significant amount of non-variable and dispatchable renewable generation. As the need for renewable energy increases, whether from renewable resource mandates or from greenhouse gas controls, widening the diversity of each utility's renewable resources by adding alternatives such as biomass becomes economical and desirable. Biomass-fired generation will increase Wisconsin's opportunities to promote the state's economy, and making Wisconsin's electric system more self-sustaining will make it more secure.

The proposed project will also utilize existing infrastructure and, unlike wind power, will not require a greenfield site for the project. Locating the project at Bay Front will reduce total costs. In addition, replacing Unit 5 and continuing its operation at Bay Front will be advantageous because, as discussed above, northwest Wisconsin has limited generation capacity and early retirement of Unit 5 could harm system reliability.

The record demonstrates that NSPW's project is cost-effective and technically feasible. It offers additional advantages of investing capital in the state, furthering the development of renewable resource technology, retaining Wisconsin jobs, diversifying Wisconsin's electric system, improving energy security because of the proximity of fuel to the plant, and increasing demand for forestry products. The benefits of substantially reducing air emissions and using an existing generating plant site are further evidence that NSPW's project is environmentally sound. While some of the alternatives can duplicate some of these advantages, only NSPW's project can provide them all.

### **Brownfield Site**

Wisconsin Statute § 196.49(4) prevents the Commission from issuing a Certificate of Authority for the construction of electric generating equipment unless it first determines that

“brownfields, as defined in s. 560.13(1)(a), are used to the extent practicable.” Both NSPW and Commission staff concluded that Bay Front is a brownfield site, and no party has contested these conclusions, but it is unclear whether Bay Front meets the definition of Wis. Stat. § 560.13(1)(a).

That statute provides:

560.13(1)(a) “Brownfields” means abandoned, idle or underused industrial or commercial facilities or sites, the expansion or redevelopment of which is adversely affected by actual or perceived environmental contamination.

The record does not include evidence that expansion or redevelopment of Bay Front is adversely affected by actual or perceived environmental contamination.

If this project were moved to any other location, however, it no longer could share resources with Bay Front Units 1 and 2 and would likely be built at a greenfield site. That would be neither cost-effective nor environmentally sound. For these reasons the Commission concludes that Bay Front is the only practicable site for this project.

### **Biomass Consumption, Greenhouse Gases and Forest Sustainability**

NSPW maintains that its project will improve the management and health of northern Wisconsin forests because it will promote sustainable harvesting. NSPW entered testimony that expanding biomass markets will offer forestry and wildlife management opportunities, including the reduction of fuel loading and fire danger, better management of forest health and control of invasive species, improvement of wildlife habitat, pre-commercial thinning, and timber stand improvement.

NSPW introduced evidence that its project would eliminate carbon emissions from Unit 5 because coal consumption would cease and woody biomass is a “carbon neutral” fuel. It stated that the project would directly reduce approximately 200,000 tons of carbon dioxide emissions per year. Professor David Mladenoff, University of Wisconsin Department of Forest and Wildlife

Ecology, testified on behalf of Clean Wisconsin that these greenhouse gas reductions are debatable, depending on the amount of diesel fuel consumed to harvest, process, and transport the biomass and on the sustainability of forest harvesting methods. He argued that carbon life cycle analyses are needed to identify whether the project would effectively control greenhouse gases.

Given that the Energy Priority Laws require the Commission to prefer biomass over coal, the question of whether biomass is carbon neutral does not dictate the outcome of this docket. The Commission notes, however, that the record includes testimony about life cycle analyses that supports NSPW's conclusion. The record also demonstrates that greenhouse gas emissions associated with harvesting, processing, and transporting the biomass are insignificant in comparison to the enormous savings from shutting down a coal-fired generating plant. As NSPW's witness Mr. James Turnure stated, the debate is effectively whether biomass should be called a "zero-emitting" or an "ultra-low-emitting" source of carbon dioxide. The Commission recognizes, however, the forest's continued sustainability and ability to sequester carbon are critical factors when assessing whether the use of woody biomass for electric generation is environmentally sound.

A forest that is being harvested for biomass will not remain a carbon sink unless the harvesting occurs in a sustainable manner. To maintain forest sustainability, NSPW agreed that it will write contracts with its biomass harvesters requiring compliance with the Wisconsin Forestland Woody Biomass Harvesting Guidelines (Guidelines), which DNR's Wisconsin Council on Forestry approved on December 16, 2008. The Guidelines address potential impacts of increased biomass harvesting on biodiversity, soil nutrient depletion, physical properties of soil, and water quality. Their objective is to provide guidance and facilitate informed decision-making regarding harvesting woody biomass from forests, and they will be subject to periodic review and

revision. As DNR revises the Guidelines based on experience and subsequent research, NSPW will include the revisions in its contracts with harvesters.

The Guidelines recommend that most woody debris downed prior to harvest should remain on site and that woody debris from incidental breakage during harvest, as well as approximately 10 percent of tops and limbs from harvested trees, should be retained and scattered on the site. These materials help maintain soil fertility, promote biodiversity, and provide habitat for some species. The Guidelines also instruct harvesters not to remove the forest litter layer, stumps, or root systems, to protect and sustainably manage species of greatest conservation need and sensitive ecosystems, and not to harvest woody debris on shallow soils, on dry nutrient-poor soils, or in wetlands.

Clean Wisconsin does not agree that NSPW's proposal will sufficiently protect Wisconsin's forests. It is concerned that harvest sites will not be monitored for compliance with the Guidelines, because NSPW did not propose to conduct its own monitoring and DNR will only be randomly monitoring state-owned lands. Professor Mladenoff also testified on behalf of Clean Wisconsin that the Guidelines' minimum standard for retaining small woody residue in the forest may be insufficient to sustain soil fertility and biodiversity, and that the Commission should prohibit harvesting certain species that grow in sensitive wetlands or are already in decline. Without additional information about harvest locations and harvesting procedures, claims Clean Wisconsin, the environmental impacts of harvesting biomass in forests are unknown.

In its Environmental Assessment (EA), Commission staff identified measures that could be used to mitigate forest impacts from biomass harvesting. These measures, either proposed by parties or discussed in the EA, are:



1. Compliance with the 2008 Forestland Woody Biomass Harvesting Guidelines.
2. Tracking sites where woody residues or roundwood are obtained and providing periodic biomass fuel reports to the Commission and DNR.
3. Tracking and reporting the percentages of various biomass fuel components (*i.e.*, boles, woody residues, mill waste, and plantation-grown fuel) utilized at the plant as part of an annual fuel procurement plan that would be reviewed by the Commission.
4. Prohibiting the forest harvesting of one or more categories of potential fuels.
5. Limiting locations for plantations to already existing or abandoned farmland or urban land and prohibiting their establishment in existing natural woodlands.
6. Utilizing woody biomass sources according to the Advance Plan 7<sup>5</sup> priority order recommendations.
7. Supporting research to test or demonstrate the efficacy of the 2008 Forestland Woody Biomass Harvesting Guidelines.
8. Supporting adaptive resource management processes for plantations through research designed to provide feedback loops for growers, land managers and local governments.

NSPW indicated its willingness to comply with Conditions 1, 5, 7, and 8, while Clean Wisconsin recommended that the Commission impose all of the Conditions. The Commission agrees that Conditions 1, 5, 7, and 8 are reasonable. So NSPW and its contractors can gain familiarity with the Guidelines and can successfully implement them as soon as Unit 5 is functioning, it is reasonable to impose Condition 1 immediately rather than wait until this project is on line. NSPW agreed to comply with any updates to the Guidelines and impose those updates on its contractors. This practice will also help mitigate environmental impacts. While Conditions 7 and 8 are general and non-specific, it is necessary to require NSPW to devote resources to support

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<sup>5</sup> In Advance Plan 7, the Commission recommended that biomass fuels be sought in the following priority order:

- a. Wood industry residues;
- b. Urban, forest, and agricultural residues (with appropriate residue left in forest or field);
- c. Wood or herbaceous energy crops (grown in harmony with sustainable farming practices and the existing local natural landscape); and
- d. Harvest of natural woodlands, as a last resort. *Order*, docket 05-EP-7 (Dec. 22, 1995) at 21.

research on the efficacy of the Guidelines and research that is likely to produce demonstrable improvements to the Guidelines or benefits in forest management. Determining the specific support required by NSPW under these Conditions is delegated to the Administrator of the Gas and Energy Division. Condition 2 is a practical means of demonstrating compliance with the Guidelines and will help identify areas where research may be useful. The Commission finds it reasonable to impose Condition 2.

Condition 3, however, may be too difficult to implement. If different types of biomass are commingled during processing or transport, neither NSPW nor its contractors could track and report the different biomass components that comprise the fuel delivered to Bay Front. The Commission does not impose Condition 3.

Rather than prohibiting the harvest of certain woody species under Condition 4, or specifying a priority order of biomass sources under Condition 6, it is reasonable to rely on the existing terms of the Guidelines. DNR, in consultation with the Wisconsin Council on Forestry and DNR's other advisory committees, can then determine what restrictions on biomass species and sources may be needed.

An environmental monitoring and auditing program would help ensure compliance with Conditions 1 and 2. DNR's Division of Forestry is currently implementing monitoring, evaluation, and research work related to compliance with the Guidelines. It is reasonable to require that NSPW work with DNR staff to arrange for a means of monitoring compliance with the Guidelines by the utility's suppliers. It is reasonable to require NSPW to request direction from DNR staff and follow that direction, to implement a monitoring and auditing function, either through DNR or on its own. It is also reasonable to require that NSPW file a biomass fuel supply and auditing plan with the Commission, which it revises periodically to account for changes in the Guidelines, and

that NSPW regularly report to the Commission on biomass fuel procurement locations and amounts. The monitoring and auditing program will be in effect for two years from the date the facilities are placed in service, unless extended by the Commission.

Clean Wisconsin requested that the Commission only allow construction to commence after NSPW has conducted further environmental studies on its project, including a carbon life cycle analysis, and after the parties receive an opportunity for additional hearings on these studies. Clean Wisconsin's request is denied because the Conditions imposed as discussed above are sufficient to mitigate the project's environmental impacts.

### **Competition for Forestry Resources**

The Wisconsin Paper Council (WPC) is concerned that NSPW's proposed sources of biomass will not be adequate to provide both fuel for the project and raw material for paper manufacturing and other existing forest industries. WPC alleged that NSPW did not properly assess biomass supply and demand in the area, and that the project could drive up the cost of pulpwood and roundwood, creating a significant adverse impact on the forest products industry. WPC also alleged that NSPW did not properly calculate the heat rate of the biomass it intends to use, which could understate the project's fuel costs.

The record demonstrates, however, that NSPW has decades of experience in the procurement of woody biomass. Its other two boilers at Bay Front have been burning biomass since 1979. NSPW introduced evidence that its financial models properly considered boiler efficiency and fuel moisture rates. The utility also presented evidence from two assessments of biomass availability in the area. The record, including statements from WPC's own witnesses, supports the conclusion that NSPW can acquire adequate amounts of biomass at reasonable prices without compromising the supply of raw material needed for paper manufacturing and other forest

products industries. WPC recommended that the Commission make any Certificate of Authority subject to three conditions:

1. Restricting NSPW's fuel to the original biomass categories and prohibiting the use of pulpwood;
2. Requiring that NSPW's fuel acquisitions be monitored by a "nationally-recognized, independent third-party certification program" to ensure that NSPW is not consuming tree parts that could be used for another, higher value product;
3. Establishing a ceiling on the cost that NSPW may charge its retail customers for any electricity produced at Bay Front from biomass.

Because sufficient amounts of biomass are likely to be available for all users, Conditions 1 and 2 are not necessary. The project's proposed increase in biomass harvesting will be relatively small, compared to current usage by the forest products industry. The Commission also rejects Condition 3, because it would be contrary to Wisconsin's goal of increasing the use of renewable resources.

### **Promoting Innovative Technology**

NSPW argues that its project is an innovative demonstration of renewable technologies because it will be expanding biomass technology to produce syngas, for electric generation, to utility-scale projects. Under Wis. Stat. § 196.377(1), the Commission must "encourage public utilities to develop and demonstrate electric generating technologies that utilize renewable sources of energy, including new, innovative or experimental technologies." This statute also declares that the Commission "may ensure that a public utility fully recovers the cost of developing, constructing and operating such demonstrations through rates charged to customers of the utility."

NSPW maintains that some technological risk remains in its project because biomass conversion to syngas is currently occurring only in smaller projects, not projects of utility scale. For this reason, NSPW requests that the Commission expand the cost collar customarily imposed on utility construction projects. The Commission allows utilities to expend up to 10 percent more

than the approved amount when constructing a project that has received a Certificate of Authority; a utility with cost overruns exceeding 10 percent must report to the Commission. NSPW requests that the Commission use a 20 percent cost collar for Unit 5. In addition, NSPW requests that if cost overruns exceed 20 percent and the Commission directs NSPW to cease construction, the Commission grant the utility cost recovery under Wis. Stat. § 196.377(1).

Because of the potential impact on electric rates, the Commission will use the same 10 percent cost over-run threshold for this project as for other utility projects. For the same reasons, rather than guarantee NSPW's recovery of costs if the project incurs substantial cost overruns and must be shut down, the Commission will continue its normal practice of considering cost recovery after examining the prudence of the utility's acts.

#### **Compliance with Wisconsin Environmental Policy Act**

Wisconsin Statute § 1.11 requires all state agencies to consider the environmental impacts of "major actions" that could significantly affect the quality of the human environment. In Wis. Admin. Code ch. PSC 4, the Commission has categorized the types of actions it undertakes for purposes of complying with this law. As provided by this rule, the Commission produced a draft EA and took comments on the preliminary finding that an Environmental Impact Statement was not warranted. The final EA concluded that the project, if approved with certain conditions, is unlikely to have a significant impact upon the quality of the human environment. The Commission imposed those conditions. The Commission finds that the EA complies with the requirements of Wis. Stat. § 1.11 and Wis. Admin. Code ch. PSC 4.

### **Project Cost and Construction Schedule**

The estimated cost of the project by major plant account is shown in Appendix B of this Final Decision. Appendix B also includes a construction schedule for the project. NSPW anticipates a commercial operation date of 2013.

### **Certificate of Authority**

NSPW may construct, install, and place in operation equipment that would produce syngas from biomass for the production of electricity at Bay Front Unit 5 and may modify Unit 5 to burn syngas and natural gas, as described in its application and subsequent filings and as modified by this Final Decision.

### **Order**

1. The total gross project cost is estimated to be \$58,118,470. NSPW is authorized to construct the project described in the application and subsequent filings, subject to the conditions specified in this Final Decision. If the scope, design, or location of the project changes significantly, or if the project cost exceeds \$58,118,470 by more than 10 percent, as soon as such changes or cost escalations are reasonably expected, NSPW shall promptly notify the Commission.
2. NSPW shall obtain all necessary permits prior to commencing construction and operation of the facilities.
3. The contracts that NSPW writes with the harvesters supplying fuel for Unit 5 shall require compliance with the 2008 Forestland Woody Biomass Harvesting Guidelines, including updates to the Guidelines as they are developed. NSPW shall ensure that these contracts include penalty provisions in the event there is a failure to comply with the Guidelines.
4. Any contracts that NSPW writes with the harvesters supplying fuel for Units 1 and 2 shall, commencing after the date this Final Decision takes effect, require compliance with the

Guidelines, including updates to the Guidelines as they are developed. NSPW shall ensure that these contracts include penalty provisions in the event there is a failure to comply with the Guidelines.

5. NSPW shall track sites where harvesters obtain woody residues or roundwood for Units 1, 2, or 5 and shall provide biomass fuel reports to the Commission and DNR on a quarterly basis, commencing April 1, 2010.

6. NSPW shall devote resources to support research on the efficacy of the Guidelines and research that is likely to produce demonstrable benefits to the Guidelines. Determining the specific amount of support to fulfill this requirement is delegated to the Administrator of the Gas and Energy Division.

7. NSPW may not develop energy plantations to provide fuel for Unit 5 in existing natural woodlands. Any energy plantations that NSPW develops or uses to provide fuel for Unit 5 shall be located on existing or abandoned farmland or urban land. NSPW shall notify the Commission and DNR if and when it decides to develop energy plantations to provide fuel for Units 1, 2, or 5.

8. NSPW shall implement the environmental monitoring and auditing program, provide the biomass fuel supply and auditing plan, and report on biomass fuel procurement locations and amounts as described in this Final Decision. The environmental monitoring and auditing program shall remain in place for two years from the date the facilities are placed in service, unless extended by the Commission.

9. NSPW shall submit to the Commission the date when it places the facilities in service.

10. NSPW shall submit to the Commission the final actual costs, segregated by major accounts, within one year after the in-service date. For those accounts or categories where actual costs deviate significantly from those authorized, NSPW shall itemize and explain the reasons for such deviations in its final cost report.

11. Until the facility is fully operational, NSPW shall submit quarterly progress reports to the Commission that summarize the status of construction, the anticipated date of the start of construction, the anticipated in-service date, the status of environmental control activities, the expenditures to date by line item, and the overall percent of physical completion. NSPW shall include the date when construction commences in its report for that three-month period. The first report is due for the quarter ending March 31, 2010, and each report shall be filed within 31 days after the end of the quarter. Once each year, NSPW's quarterly progress report shall include a revised total cost estimate for the project.

12. NSPW shall notify the Commission in writing within ten days of any decision not to proceed with this project or to enter into any partnership or other arrangement with a third party concerning ownership or operation of the facility.

13. All commitments and conditions of this Final Decision apply to NSPW and to its agents, contractors, successors, and assigns.

14. This Final Decision takes effect on the day after it is mailed.



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15. Jurisdiction is retained.

Dated at Madison, Wisconsin, December 22, 2009

By the Commission:



Sandra J. Paske

Secretary to the Commission

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Attachments

See attached Notice of Rights

PUBLIC SERVICE COMMISSION OF WISCONSIN  
610 North Whitney Way  
P.O. Box 7854  
Madison, Wisconsin 53707-7854

**NOTICE OF RIGHTS FOR REHEARING OR JUDICIAL REVIEW, THE  
TIMES ALLOWED FOR EACH, AND THE IDENTIFICATION OF THE  
PARTY TO BE NAMED AS RESPONDENT**

The following notice is served on you as part of the Commission's written decision. This general notice is for the purpose of ensuring compliance with Wis. Stat. § 227.48(2), and does not constitute a conclusion or admission that any particular party or person is necessarily aggrieved or that any particular decision or order is final or judicially reviewable.

*PETITION FOR REHEARING*

If this decision is an order following a contested case proceeding as defined in Wis. Stat. § 227.01(3), a person aggrieved by the decision has a right to petition the Commission for rehearing within 20 days of mailing of this decision, as provided in Wis. Stat. § 227.49. The mailing date is shown on the first page. If there is no date on the first page, the date of mailing is shown immediately above the signature line. The petition for rehearing must be filed with the Public Service Commission of Wisconsin and served on the parties. An appeal of this decision may also be taken directly to circuit court through the filing of a petition for judicial review. It is not necessary to first petition for rehearing.

*PETITION FOR JUDICIAL REVIEW*

A person aggrieved by this decision has a right to petition for judicial review as provided in Wis. Stat. § 227.53. In a contested case, the petition must be filed in circuit court and served upon the Public Service Commission of Wisconsin within 30 days of mailing of this decision if there has been no petition for rehearing. If a timely petition for rehearing has been filed, the petition for judicial review must be filed within 30 days of mailing of the order finally disposing of the petition for rehearing, or within 30 days after the final disposition of the petition for rehearing by operation of law pursuant to Wis. Stat. § 227.49(5), whichever is sooner. If an *untimely* petition for rehearing is filed, the 30-day period to petition for judicial review commences the date the Commission mailed its original decision.<sup>1</sup> The Public Service Commission of Wisconsin must be named as respondent in the petition for judicial review.

If this decision is an order denying rehearing, a person aggrieved who wishes to appeal must seek judicial review rather than rehearing. A second petition for rehearing is not permitted.

Revised: December 17, 2008

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<sup>1</sup> See *State v. Currier*, 2006 WI App 12, 288 Wis. 2d 693, 709 N.W.2d 520.

**APPENDIX A**

In order to comply with Wis. Stat. § 227.47, the following parties who appeared before the agency are considered parties for purposes of review under Wis. Stat. § 227.53.

Public Service Commission of Wisconsin  
(Not a party but must be served)  
610 N. Whitney Way  
P.O. Box 7854  
Madison, WI 53707-7854

**NORTHERN STATES POWER COMPANY**

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John D. Wilson  
Michael Best & Friedrich LLP  
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Madison, WI 53701-1806

**CITIZENS UTILITY BOARD**

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Madison, WI 53703

**COOPERATIVE NETWORK**

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Madison, WI 53703

**RENEW WISCONSIN**

Michael Vickerman  
222 South Hamilton Street  
Madison, WI 53703

**WISCONSIN PAPER COUNCIL**

Todd Palmer  
DeWitt Ross & Stevens S.C.  
2 East Mifflin Street, Suite 600  
Madison, WI 53703-2865

## APPENDIX B

### Project Cost

Costs	Amount
<b>Mechanical</b>	\$29,053,250
<b>Electrical and Controls</b>	\$2,010,500
<b>Civil/Structural</b>	\$3,758,250
<b>Design and Engineering; Field Engineering</b>	\$3,140,000
<b>Indeterminates, Contractor Overhead, and Profit</b>	<u>\$4,474,700</u>
<b>Subtotal Direct Costs</b>	\$42,436,700
<b>Indirect Costs</b>	\$6,657,650
<b>Estimated Escalation to Time of Expenditure</b>	\$3,740,623
<b>Contingency, 10 percent</b>	<u>\$5,283,497</u>
<b>Project Total</b>	<u><b>\$58,118,470</b></u>

### Estimated Construction Schedule

Construction Milestone	Anticipated Completion Date
Receive Air and Water Permits	February 11, 2010
Minnesota PUC Recovery Approval Received	December 10, 2010
Start Construction	September 11, 2011
Foundation Complete	December 16, 2011
Backfeed Power Available	May 30, 2012
Construction Complete	August 15, 2012
Provisional Acceptance	September 21, 2012
Commercial Operation	October 12, 2012
Project Commissioned	January 30, 2013

BEFORE THE  
PUBLIC SERVICE COMMISSION OF WISCONSIN

Northern States Power Company - Wisconsin, an Xcel Energy Company,  
Request for Approval to Construct a Biomass Gasifier at its Bay Front  
Generating Facility

4220-CE-169

**CONCURRENCE OF COMMISSIONER LAUREN AZAR**

I concur in the outcome of the *Final Decision* that grants a Certificate of Authority to construct and place in operation a biomass gasifier at the Bay Front site. As the Commission works to implement policy changes that will require new commitments to renewable energy and carbon emission reductions, it is likely that we will see other proposals like the one approved here. I write separately to identify some of my specific reasoning for approving this project, reasoning that differs from the majority opinion. Further, I want to identify some process issues from this case and encourage modifications for future cases.

**Project Need**

Under the Certificate of Authority statute, the Commission “may refuse to certify a project” if the Commission concludes that the project will “provide facilities unreasonably in excess of probable future requirements.” Wis. Stat. § 196.49(3)(b) and (b)2. Under this statute, the Commission has considerable discretion; indeed, the Commission may approve the project even if it finds that the project provides facilities that are in excess of probable future requirements. Hence, the Commission need not find that this project was necessary to meet the current Renewable Portfolio Standard to approve this project. *Id.* (The Commission “*may* refuse to certify . . . .”) (Emphasis added.)

The record in this case did not provide a basis for me to refuse to certify the project. I believe the record provided strong evidence to suggest that the need for renewable generation is likely to increase with limitations on carbon reductions.

My conclusion is this: despite the fact that a particular project may not be necessary to meet renewable or environmental requirements under current law, under Wis. Stat. § 196.49, the Commission has discretion to approve the project anyway. Applying our discretion properly (as we did here) should encourage Wisconsin utilities to be proactive in their planning for future generation needs.

### **Cost Effectiveness of the Project**

Another provision of Wis. Stat. § 196.49 gives the Commission discretion to refuse to certify a proposal if the project will “add to the cost of service without proportionately increasing the value or available quantity of service.” Wis. Stat. § 196.49(3)(b)3. A key consideration in this case (and others) is what constitutes “value” of a service? When this statute is considered along with the renewable requirements of Wis. Stat. § 196.378, there is broad set of values that the Commission can and should consider.

Much of Wisconsin’s renewable resources requirements are being met with variable resources like wind energy. Variable resources are valuable and should continue to be pursued, but we cannot turn a blind eye to the challenges that they introduce into the operation of a transmission grid and an energy market. Developing renewable energy resources that do not compound these challenges provides a value that I considered in this case and will consider in future cases.

In this case, the cost differences among the various alternatives, which included variable wind resources, were very similar. When considering the benefits of an additional non-variable

renewable resource, this project clearly meets the cost-effectiveness standard of Wis. Stat.

§ 196.49(3)(b)3.

### **Other Issues for Consideration in Future Cases**

This case raised procedural issues that I hope can be avoided in future cases. First, the environmental review process in this case was not a model that should be followed in the future. The Commission has a duty to follow the Wisconsin Environmental Policy Act. This is an important duty and one that we should not become complacent at following. In this case, the Final Environmental Assessment concluded that a more thorough Environmental Impact Statement (EIS) was not necessary, provided the Commission adopted several enumerated conditions. Had the Commission not approved these conditions, we would have been required to take several steps backwards and taken significant time to complete an EIS. If the goal of this process was to save time, it could have gone the other way and actually significantly stalled the process. If staff concludes that conditions are necessary to avoid the completion of an EIS, then those conditions should be brought to the Commission's attention as early as possible to avoid unnecessary delays in the overall process.

Second, as the Commission considers applications for additional renewable energy, it will be important to identify the specific attributes of various renewable resources. As noted above, the dispatchable nature of a biomass gasifier added value to the preferred alternative in this case. However, the full extent of these benefits was not fully developed in this record. While the Commission has discretion on this issue, additional evidence on such values would be helpful.

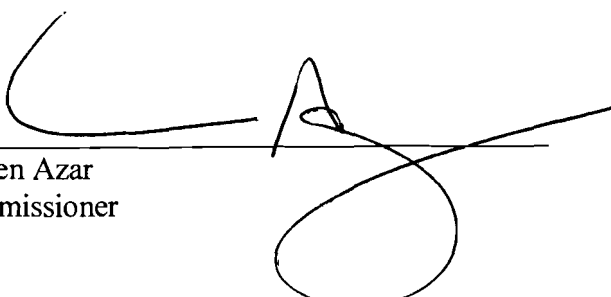
Similarly, the record lacked evidence concerning the reliability impacts that would be present if Bayfront Unit 5 were retired in 2015, which was a potential outcome of our decision in

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this docket. While staff witness Kenneth Detmer identified that there would be impacts on reliability if this unit were retired because of the lack of generation in this geographic area of the state, the full extent of these impacts was not clear. Since the Commission may be considering plant retirements in more dockets, information on system reliability impacts of retirements will be critical evidence.

For the reasons set forth above, I respectfully concur in the Commission's *Final Decision*.

Dated at Madison, Wisconsin, December 22, 2009



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Lauren Azar  
Commissioner

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